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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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09/665,818

09/20/2000

Chien-Ping Huang

U 013803-1

8042

7590

11/08/2002

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EXAMINER

FARAHANI, DANA

ART UNIT

PAPER NUMBER

2814

DATE MAILED: 11/08/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/665,818

Applicant(s)

HUANG, CHIEN-PING

Examiner

Dana Farahani

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 September 2002.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-4, 6-11, 13-18, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsman et al., hereinafter Kinsman (U.S. 6,159,764) in view of Terashima (U.S. 6,329,228), both previously cited, and further in view of Yamaguchi (U.S. Patent 6,081,029), a newly cited reference.

Regarding claims 1, 6-8, 13-15, 18, and 20, Kinsman discloses in figure 1C a semiconductor package comprising a die 74 having an active surface; a lead frame 78, including a plurality of leads 76 electrically connected to the active surface of the die, the leads having a surface; an encapsulant, not numbered, sealing the die and at least a portion of the surface of the leads in the lead frame; a heat sink 88 attached to the second surface of the die and at least a portion of the surface of leads in the plurality of leads with a thermally conductive and electrically insulating glue 82; and the heat sink is exposed to the environment at the bottom part, as can be seen in the figure.

Kinsman does not disclose a die pad on which the die being attached to. Terashima discloses in column 1, lines 46-49 that a die pad is used for fixing the chip on a board surface. Therefore, it would have been obvious to one of ordinary skill in the art

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at the time the invention was made to mount the die on a die pad in order to further secure the die on the heat sink.

Kinsman in view of Terashima does not disclose a hole in a die pad for the glue and the heat sink to stick with it.

Yamaguchi discloses that a die pad provided with a hole will be hold more strongly in place with a resin type material, which would be in the hole (see column 3, lines 42-45). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make a hole in the die pad of Kinsman so the glue with the heat sink and the die pad would be attached more strongly together.

Regarding claims 2, 9, and 16, Kinsman in view of Terashima discloses the claimed invention except expressly disclosing the heat sink is made of material selected from the group consisting of copper, copper alloy, aluminum or aluminum alloy. It would have been obvious to one of ordinary skill in the art at the time the invention was made to use one of these materials as the heat sink, since it was known in the art that these materials are commonly used as heat sinks.

Regarding claims 3, 10, and 17, see column 5, line 27.

Regarding claims 4 and 11, see figure 1A.

3. Claims 5, 12, and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kinsman in view of Terashima as applied to claim 4 above, and further in view of Yamashita (U.S. 5,789,820), previously cited.

Kinsman in view of Terashima discloses the limitations in claim 4 and 5 except a heat radiator on top of the heat sink. Yamashita discloses in figure 6 a heat radiator 17

on top of heat sink 12. therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the heat radiator in conjunction with the heat sink in order to radiate the heat from the heat sink.

Response to Arguments

4. Applicant's arguments with respect to the pending claims have been considered but are moot in view of the new grounds of rejection.

Briefly reciting, the applicant argues that the heat sink of the instant application is exposed to the ambient environment, while in the primary reference cited, the heat sink is completely inside the encapsulant. In fact, the primary reference, Kinsman, discloses in figure 1C, as above discussed, that the heat sink is not completely inside the encapsulant.

Conclusion

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the

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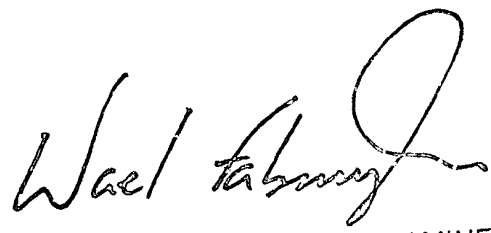
shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (703)305-1914. The examiner can normally be reached on M-F 9:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (703)308-4918. The fax phone numbers for the organization where this application or proceeding is assigned are (703)872-9318 for regular communications and (703)872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

Dana Farahani
November 4, 2002


SUPERVISORY PRIMARY EXAMINER
TECHNOLOGY CENTER 2000